

Droughts.—Houston, Fla., month very dry, impeding the growth of vegetation.

High Tides.—15th, Atlantic City, N. J., severe NE. gale; high tide, sweeping railroad track. 16th, Charleston, unusually high tides. Cape Lookout, very high tide. 30th, Sandy Hook, very high tides, injured jetties.

Hail.—2d, Tex. Kan.; 3d, Wy. T., Ohio; 4th, Ohio; 5th, Ohio, N. C., Va.; 6th, N. C.; 7th, Kan., Neb., Ind. T., Tex., Tenn., Ill., Iowa; 8th, Wy. T., Tex., Ill., La., Miss.; 9th, Mich., Pa.; 10th, Col., Wy. T., Minn., Ohio, Mich., Ind., Pa.; 11th, Col., W. Va., Ohio, N. Y., Va., R. I., Conn., Wy. T., Ill., Mass., N. J., Pa., Vt.; 12th, Ind., Neb., N. H., N. Y.; 13th, Mass., Me., N. Y., Vt.; 15th, Col.; 16th, Fla.; 17th, Col., Mo., Neb.; 18th, Col., Tex., Miss., Iowa, Ark., Kan., N. J.; 19th, Kan., Iowa, Mich., Minn., Ill., Ky., Wis.; 20th, W. Va., N. Y., Pa.; 21st, Va., Wy. T., N. J., Pa.; 22d, Neb.; 23d, Minn., Ind. T., Ill., Iowa, Kan.; 24th, Va., Wis.; 25th, N. M., Iowa, Ky., Me., Vt.; 26th, Tex., N. H., Me., N. Y., Vt.; 27th, Me., Vt.; 28th, Kan., Iowa, Mass., Neb.; 29th, Kan.; 30th, Neb., Iowa, Md.; 31st, Fla., Iowa, Mo.

Rainy Days.—The number of days on which rain or snow has fallen varies as follows: New England, 6 to 21; Middle Atlantic States, 12 to 17; South Atlantic States, 5 to 13; Gulf States, 5 to 11; Ohio valley and Tennessee, 12 to 18; Lower Lake region, 11 to 19; Upper Lake region, 10 to 18; Upper Mississippi valley, 11 to 21; Lower Missouri valley, 11 to 15; Northwest, 10 to 19; Western Plains, 8 to 15; Rocky Mountains, 6 to 23, and Pacific coast, 3 to 11.

Cloudy Days.—For New England, the number varies from 6 to 21; Middle Atlantic States, 5 to 14; South Atlantic States, 2 to 9; Gulf States, 4 to 13; Ohio valley and Tennessee, 3 to 11; Lower Lake region, 7 to 13; Upper Lake region, 7 to 12; Upper Mississippi valley, 7 to 17; Lower Missouri valley, 14 to 16; Northwest, 10 to 21; Western Plains, 13 to 18; Rocky Mountains, 2 to 8, and Pacific coast, 3 to 17.

Snow fell as follows: New Hampshire, 12th, 13th; Vermont, 12th, 14th; Massachusetts, 11th, 13th, 14th; Connecticut, 15th; New York, 12th; New Jersey, 11th; Pennsylvania, 11th; Ohio, 10th; Michigan, 4th, 10th to 12th, 14th, 15th; Wisconsin, 4th, 11th; Minnesota, 3rd, 10th; Iowa, 3rd, 11th, 12th; Nebraska, 11th, 12th, 17th; Dakota, 2nd, 3rd, 11th, 12th; Wyoming, 2nd, 6th to 8th, 16th to 19th; and, in Colorado, on Pike's Peak, 1st to 3rd, 6th, 7th, 12th, 14th, 15th, 18th to 21st, 24th, 25th; snow on summit, at end of month, 30 inches, and in gulches 60 feet deep; New Mexico, 17th; Utah, 16th, 17th; Nevada, 12th to 14th, 20th, 21st, 22nd, 28th, 31st.

RELATIVE HUMIDITY.

The average percentage of relative humidity for the month ranges as follows: New England, 59 to 78; Middle Atlantic States, 60 to 77; South Atlantic States, 59 to 80; East Gulf States, 67 to 75; West Gulf States, 61 to 77; Lower Lake region, 61 to 71; Upper Lake region, 64 to 75; Ohio valley and Tennessee, 58 to 67; Upper Mississippi valley, 57 to 70; Lower Missouri valley, 63 to 65; Red River of the North valley, 59 to 67; Eastern slope, from Dakota to interior of Texas, 45 to 72; Western plateau, 34 to 50; California, 48 to 75. High stations report the following: Mt. Washington, 91; Pike's Peak, 63; Cheyenne, 58; Denver, 47; Santa Fe, 24.

WINDS.

The prevailing winds at Signal Service stations are shown by arrows, flying with the wind on chart No. II. East of the Mississippi the prevailing direction is westerly; in the Southwest, southerly, and in the Northwest, northwesterly. The maximum velocities have already appeared under the description of storm-areas.

Total Movements of the Air.—The following are the *largest* monthly movements as recorded at the Signal Service stations, viz: Pike's Peak, 20,276 miles; Cape Lookout, 11,918; North Platte, 11,055; Cape May, 10,467; Kittyhawk, 10,465; Indianola, 10,454; Breckenridge, 10,134; Dodge City, 10,064; Sandusky, 9,839; Sandy Hook, 9,764; Decatur, 9,742, and Cape Hatteras, 9,741. The total movements is not recorded on Mt. Washington, but velocities exceeding 70 miles per hour occurred on six days. The *smallest* are: Deadwood, Dak., 2,226 miles; Campo, 2,378; Lynchburg, 2,499; Roseburg, 2,759; Visalia, Cal., 2,892; Boerne, Tex., 2,981; Brackettville, Tex., 3,354; Nashville, 3,425; Augusta, 3,450; Los Angeles, 3,459; Shreveport, 3,479; Montgomery, 3,520; Knoxville, 3,770; Springfield, Mass., 3,925.

Tornadoes, accompanying storm-area No. XII. The following notes on the severe tornado of the 23rd, in southern Wisconsin, will serve to show the course of the storm. It was probably first noticed by an observer situated in a valley about ten miles west of Mineral Point, who states, "that he saw the cyclone traveling at the rate of about five miles an hour—it seemed to gather strength as it moved—when it struck the hill it shot off in the direction of Mineral Point, and after it had passed him he could hear it roar miles away." Prof. Hinrich's reports, "tornado-cloud observed during p. m., 23d, in Jones Co., Iowa," and states in Iowa Monthly Weather Review, "probably the same which, a few hours later, came down to earth's surface in Wisconsin, near Mineral Point." The storm entered Mineral Point, Iowa Co., from the SW., and passed along a ridge of ground extending over $\frac{1}{2}$ of a mile in width; it then struck a two-story frame house, containing 13 rooms, completely demolished it, and carried one of the inmates 400 feet in the air, and then dashed her to the ground dead; a rafter from this house was found one mile distant, driven over five feet in the ground. A large barn 300 feet NW. of this house was also demolished, and carried in an opposite direction to the passage of the cy-

clone. Immense damage was done to the property in this vicinity, and a number of persons killed and wounded; "a barn and horse were carried completely away, and neither horse, barn, nor any portion of either, have since been found." "About 2½ miles E. of city a school-house was carried away, with the teacher and scholars. The teacher was badly injured and two scholars killed." The cyclone then passed eastward over the southern portion of Dane Co.; at Perry, houses and barns were totally demolished—many persons killed. At Primrose, (about 4 p. m.) houses and barns were totally demolished, many persons killed; hail size of tea-cups, breaking glass on W. and N. exposures; rain fell in torrents, flooding fields and sweeping away fences. Verona Corners and vicinity, severe hail-storm, breaking all glass on W. exposures; hail-stones eight inches in circumference; streams in vicinity flooded. Montrose, houses destroyed. Oregon Cemetery, monuments shattered and number of plain stones broken off. Fitchburg, (7 or 8 miles SW. of Madison) farm house carried entirely away, track of storm 2 miles wide. From Primrose, (25 miles SE. of Madison,) through Mt. Vernon to Paoli, wide-spread damage is reported, 12 to 15 persons killed. Near Oregon, 2 horses carried 100 ft. and dashed to earth, killing them instantly—storm raised from the ground 7 or 8 miles SW. of Madison; again struck ground near Ft. Atkins, NE. of Madison. Near Primrose and Paoli the storm seemed from a ½ to 1 mile in width. Madison, 4 to 4:30 p. m., cyclone from SSW., buildings destroyed; during the heavy rain, the air was suddenly observed to be filled with falling leaves, small twigs, shingles, laths and large sticks, (one board measuring 8 ft. long and 1 ft. wide, seemingly to have been wrenched from a house,) all filling the air as high as the eye could reach, and falling straight to the earth. "In the outskirts of the storm-belt, there appeared to be two strata of clouds, the lower a heavy mist, through the occasional breaks of which could be seen the upper layer of heavy black clouds, snarled, tangled and quivering, from which was discharged all kinds of debris." No notes have yet come to hand from the east portion of Dane Co., but the cyclone entered Jefferson Co. about 5:15 p. m., where the "tornado struck the earth at Cedar Lake," passing eastward; average width of path, 30 rods, although, in places, half mile wide; left the earth again at Bulkwinklesville, sixteen miles east of Cedar Lake. Eye-witnesses state that the water in west end of Cedar Lake was lifted up two hundred feet, leaving bottom of lake clearly visible. Oakland, houses and barns destroyed, persons killed and injured; track one mile wide, damage done in less than three minutes; in Rome and Hebron, barns were blown down and unroofed. The storm then entered Waukesha Co., commencing about 5 p. m. at Waukesha, and lasting about two hours; wind blowing in all directions; houses unroofed, sidewalks torn up, trees and fences blown down. Milwaukee, 6:42 to 7:35 p. m., severe tornado, path of greatest severity from SSW. to NNE. and very narrow; buildings blown down; tornado appears to have dissipated over Lake Michigan. Barrington, Cook co., Ill., terrific storm: about 6 p. m., the storm-cloud was observed approaching from SW., accompanied by an almost indescribable noise; when about 200 yards from observer it struck the ground, with a deafening noise, and seemed to rest a moment; then rose in air about 55 feet, carrying up a mass of earth, trees and debris; it again descended, and striking the side of a farm house, carried it up, whirling it over and over, and completely demolished it at an elevation of about 150 feet. The inmates were all killed, and the observer had to hold on to the grass with his full strength to keep from being drawn into the vortex. The storm-cloud was observed advancing at a distance of four miles, and after destroying other buildings passed over in a northeasterly direction; in several places, where the storm struck the ground, it would carry up earth, &c., and leave a hole from 150 to 300 ft. square. About 6:30 p. m., a SW. hurricane prevailed at Highland Park, (on the Lake shore,) followed by huge hail-stones, 3½ inches in diameter, resulting from the meeting of two storms from the NW. and SW.; belt of hail ½ mile wide; laths and debris fell before the hail, the whole lasting from 15 to 20 minutes; huge hail also fell at Riverside, Winnetka and Park Ridge. Tornado in Adams and Brown Cos., Ill.; appeared about 6:30 p. m. about 1 mile south of Mound station, coming from W. and passing a little S. of E.; houses and barns carried away, horses, cows, &c., killed, and persons injured.

Waterspout.—26th, Decatur, Tex., 4:45 p. m., waterspout passed southward down Sandy Creek, tearing up trees, fences, &c.

VERIFICATIONS.

Indications.—The detailed comparison of the tri-daily weather indications with the telegraphic reports for the succeeding twenty-four hours shows a general percentage of omissions of 0.2 per cent., and of verifications of 83.2 per cent. The percentages of verifications for the four elements have been: Weather, 87.6; Wind, 86.6; Temperature, 82.1; Barometer, 76.6. The percentages of verifications by geographical districts have been: New England, 84.0; Middle States, 86.6; South Atlantic States, 84.6; East Gulf States, 82.3; West Gulf States, 80.9; Lower Lake region, 84.8; Upper Lake region, 83.5; Tennessee and Ohio valley, 82.5; Upper Mississippi valley, 82.7; Lower Missouri valley, 80.6. Of the 3,713 predictions that have been made, 139, or 3.7 per cent., are considered to have entirely failed; 120, or 3.2 per cent., were one-fourth verified; 592, or 15.9 per cent., were half verified; 390, or 10.5 per cent., were three-fourths verified; 2,472, or 66.7 per cent., were fully verified, so far as can be judged from the weather maps.

Cautionary Signals.—During the month 228 Cautionary Signals were displayed; 151, or 66.2 per cent., were justified by subsequent hourly velocities of 25 miles and over, at or within 100 miles of the station. Four signals were late and two were lowered too early; 77 were not justified.